AMENDMENTS TO THE CLAIMS:

The following listing of claims supersedes all prior versions and listings of claims in this application:

1. (Currently Amended) A substrate-based assembly for carrying optical and/or electrical components, the assembly comprising:

a substrate;

at least one optical component assembled with at least one different component for use together in providing a function in use of the assembly;

a packaging layer for said assembled components, the assembled components and the packaging layer being carried by the substrate;

wherein the packaging layer comprises a hybrid glass material having both organic and inorganic components and is provided with at least one recess for use in assembling said components, being otherwise substantially continuous.

2. (Withdrawn) A substrate-based assembly according to claim 1, wherein the hybrid glass material includes an organic component which polymerizes by cross-linking.

3. (Withdrawn) A substrate-based assembly according to claim 1, wherein the hybrid glass material includes an organic component which polymerizes under thermal or photo treatment.

4. (Withdrawn) A substrate-based assembly according to claim 1, wherein the hybrid glass material includes at least one of an epoxy component, aluminium oxide and silicon oxide.

5. (Withdrawn) A substrate-based assembly according to claim 1, wherein the hybrid glass material comprises an inorganic matrix provided at least in part by a metal alkoxide or salt, the metal alkoxide or salt each being hydrolyzed in provision of the inorganic matrix.

6. (Withdrawn) A substrate-based assembly according to claim 5 wherein the metal alkoxide or salt is based on groups 3A, 3B, 4B and/or 5B of the Periodic Table.

7. (Withdrawn) A substrate-based assembly according to claim 1, wherein the hybrid glass material includes at least one hydrocarbon compound from the group comprising acrylates, epoxides, alkyls, alkenes, and aromatic groups.

8. (Withdrawn) A substrate-based assembly according to claim 1 wherein the coefficient of thermal expansion of the packaging layer approaches that of the substrate material.

9. (Withdrawn) A substrate-based assembly according to claim 1 which further comprises electrical interconnect material for providing electrical connection to at least one component packaged by the packaging layer.

10. (Withdrawn) A substrate-based assembly according to Claim 9 wherein the coefficient of thermal expansion of the packaging layer approaches that of the electrical interconnect material.

11. (Withdrawn) A substrate-based assembly according to Claim 8 wherein the coefficient of thermal expansion of the packaging layer differs from the coefficient of

thermal expansion of the electrical interconnect material and/or the substrate material by not more than 15 parts per million.

12. (Withdrawn) A substrate-based assembly according to claim 9 which further comprises at least one contact pad for a wire bond to the at least one component, the electrical interconnect material being present in said contact pad or wire bond.

13. (Withdrawn) A substrate-based assembly according to claim 9 which further comprises at least one mounting pad for mounting the at least one component, the electrical interconnect material being present in said mounting pad.

14. (Previously Presented) A substrate-based assembly according to claim 1, wherein said at least one optical component comprises a bump bonded optical component.

15. (Withdrawn) A substrate-based assembly according to claim 1 wherein the material of the packaging layer is lithographically patterned.

16. (Withdrawn) A substrate-based assembly according to Claim 15 wherein the material of the packaging layer comprises at least one organic material which photopolymerizes, the at least one organic material being selected from the group comprising acrylates, epoxides, alkyls, alkenes, and aromatic groups.

17. (Withdrawn) A substrate-based assembly according to claim 1 wherein the packaging material has a processing temperature of not more than 450°C.

18. (Withdrawn) A substrate-based assembly according to claim 1 wherein the packaging material has a processing temperature of not more than 200°C.

19. (Withdrawn) A substrate-based assembly according to claim 1 wherein the packaging material has a processing temperature of not more than 150°C.

20. (Withdrawn) A substrate-based assembly according to Claim 17 wherein the packaging material is fabricated from a material comprising a polymerisation initiator.

21. (Previously Presented) A substrate-based assembly according to claim 1 wherein said at least one different component comprises an electronic device.

22. (Previously Presented) A substrate-based assembly according to Claim 21 wherein the electronic device comprises an integrated circuit.

23. (Previously Presented) A substrate-based assembly according to claim 1, wherein said at least one optical component comprises an active optical component and said at least one different component comprises a passive optical component.

24. (Withdrawn) A substrate-based assembly according to claim 1 having a substrate comprising at least one material from the group comprising silicon, glass, composite materials, ceramics and printed circuit board.

25. (Withdrawn) A substrate-based assembly according to claim 1 wherein the packaging layer is a passivation layer.

26. (Withdrawn) A substrate-based assembly according to claim 1 wherein the packaging layer is a planarisation layer.

27. (Withdrawn) A substrate-based assembly according to Claim 26 wherein the planarisation layer provides an optical function in use of the assembly.

28. (Withdrawn) A substrate-based assembly according to Claim 27 wherein the optical function comprises waveguiding.

29. (Previously Presented) A substrate-based assembly according to Claim 1 wherein said at least one recess comprises an aperture to give access to an electrical interconnect structure.

30. (Withdrawn) A substrate-based assembly according to Claim 26 wherein one or more components or devices is mounted at least partially on the planarization layer and the planarization layer provides support to said one or more components or devices.

31. (Withdrawn) A substrate-based assembly according to claim 1, comprising at least two packaging layers, each of said at least two packaging layers comprising a hybrid glass material having both organic and inorganic components.

32. (Withdrawn) A substrate-based assembly according to Claim 31 wherein the refractive index of a first of the at least two packaging layers is different from the refractive index of a second of the at least two packaging layers.

33. (Withdrawn) A substrate-based assembly according to claim 1 wherein the packaging layer, or at least one packaging layer, transmits optical radiation in use of the assembly.

34. (Withdrawn) A substrate-based assembly according to claim 1 wherein the packaging layer, or at least one packaging layer, provides a waveguiding function in use of the assembly.

35. (Withdrawn) A substrate-based assembly according to claim 1 wherein the packaging layer, or at least one packaging layer, provides an alignment feature for use in aligning an optical component in the assembly.

36. (Withdrawn) A substrate-based assembly according to claim 1 wherein the packaging layer, or at least one packaging layer, provides refractive index matching in use of the assembly.

37. (Withdrawn) A substrate-based assembly according to claim 1 wherein the packaging layer, or at least one packaging layer, provides bonding between optical components in the assembly.

38. (Previously Presented) A substrate-based assembly according to claim 1 wherein said at least one optical component comprises an active optical component.

39. (Original) A substrate-based assembly according to Claim 38 wherein the active optical component comprises a laser or a tunable optical source.

40. (Previously Presented) A substrate-based assembly according to claim 38 wherein said at least one recess comprises an aperture to give access to an electrical interconnect structure and wherein the active optical component is bump-bonded in the assembly to provide the electrical interconnect structure.

41. (Previously Presented) A substrate-based assembly according to claim 38 wherein said at least one recess comprises an aperture to give access to an electrical interconnect structure and wherein the active optical component is flip-chip mounted in the assembly to provide the electrical interconnect structure.

42. (Previously Presented) A substrate-based assembly according to Claim 41, wherein the active optical component comprises a laser or a tunable optical source, the assembly further comprising an optical modulator, external to the laser or tunable optical source.

43. (Withdrawn) A substrate-based assembly according to claim 1 wherein the substrate-based assembly comprises a thick substrate-based assembly.

44. (Withdrawn) A substrate-based assembly according to claim 1 wherein the substrate-based assembly has a thickness in the range from 1 micron to 1 millimetre.

45. (Previously Presented) Opto-electronic equipment comprising a substrate-based assembly according to claim 1.

46. (Withdrawn) A method of making a substrate-based assembly as described in claim 1 by packaging a substrate-based assembly according to a method comprising

providing a packaging layer comprising a hybrid glass material having both organic and inorganic components.

47. (Withdrawn) The method according to Claim 46, wherein the method further comprises the step of lithographic processing of the packaging layer.

48. (Withdrawn) A method of fabricating a substrate-based assembly as described in claim 1, the method comprising:

lithographic processing of each fabricated layer of the substrate-based assembly, at least one fabricated layer comprising a hybrid glass material having both organic and inorganic components.

49. (Withdrawn) A method of fabricating a substrate-based assembly, the assembly being according to Claim 1, using bump bonding material to bump bond the at least one optical component to a mounting pad, wherein the method comprises:

a) maintaining the temperature of the bump bonding material above a softening temperature for the material and micro-manipulating the component in relation to the mounting pad; and

b) lowering the temperature of the bump bonding material to below said softening temperature so as to achieve bump bonding.

50. (Withdrawn) A method of fabricating a substrate-based assembly as described in claim 1, the method comprising:

using gray scale lithography to fabricate a groove of tapered cross section in a packaging layer for mounting a fibre for optical coupling with the at least one optical component, said packaging layer comprising a hybrid glass material having both organic and inorganic components.

51. (Withdrawn) A method of fabricating a substrate-based assembly according to Claim 1 which comprises depth adjustment in a packaging layer.

52. (Withdrawn) A method of fabricating a substrate-based assembly according to Claim 51 wherein said depth adjustment comprises the use of a lithography mask having non-uniform optical density.

53. (Withdrawn) A method of fabricating a substrate-based assembly as described in claim 1, the method comprising:

applying an electrical interconnect structure to a surface carried by the substrate;

applying a planarization layer over the electrical interconnect structure; and

creating one or more apertures in the planarization layer to give access to the electrical interconnect structure,

said planarization layer comprising a hybrid glass material having both organic and inorganic components.

54. (New) A substrate-based assembly for carrying optical and/or electrical components, the assembly comprising:

a substrate;

at least one optical component assembled with at least one different component for use together in providing a function in use of the assembly;

a packaging layer for said assembled components, the assembled components and the packaging layer being carried by the substrate;

wherein the packaging layer comprises a hybrid glass material having both organic and inorganic components and is provided with at least one recess for use in assembling said components, said recess having a perimeter which is substantially

closed into which a protected optical component, or electrical interconnect structure therefor, is assembled.